XMMS2 Collections

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Swiss Federal Institute of Technology, Lausanne



XMMS2 Music Player



Playlouder MSP

Outline

- I. Introduction
- 2. Concept
- 3. Usage
- 4. Future
- 5. Conclusion

I. Introduction

"why all the fuss?"

Personal Interests

The project initially comes from personal interest in:

- Software engineering design smart abstractions to build powerful things
- Information architecture exploit computers to manage large collections of structure information

XMMS2 Land



XMMS2 Media Library

- SQLite database
- Store of objects ("media", typically songs) with arbitrary properties
- Denormalized schema, with unique (id, key)

id	key	value
42	artist	Britney Spears
42	title	Toxic
42	duration	245497
43	artist	Beyonce

• SQL queries require lots of JOINs

- Browse
- Search
- Organize

• Browse

• Search

• Organize

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Top 25 Most Played	Guest Room	2007	9 of 12	3:21	The National	Boxer
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• Browse

• Search

• Organize

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BrowseSearchOrganize

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i.e.

view & manipulate subsets of the media library

The Problem

- Abstract the structure of the media library
- Simplify querying of subsets of the media library
- Share abstraction of such subsets among clients
- Allow refining, editing, composing the subsets

The Problem

Old API



The Solution



The Solution



2. Concept

"what are you on about?"

"A collection is a representation of a subset of the media library, structured as a Directed Acyclic Graph (DAG) of operators."

Universe











Source Operators

All media in the Media Library





Universe

All media in the saved collection \$name in \$namespace

Saved Collections



25









Filter Operators



All media where \$field satisfies the comparison \$operation with \$value (\$operation: <, <=, =, =>, >)

Match

\$field

\$pattern

Similar to Compare, but takes a \$pattern with wildcards (*, ?) instead of an exact value



Universe

Universe

Compare artist="The XX"









Browse



Remarks

- Used to organize, browse, search, or any combination of those
- Can use different UI approaches to combine them, but all using the collection API
- Dynamic sets but allows manual edits

Collections 2.0

Google Summer of Code 2008 project by Erik Massop (nesciens)

• Support for sources:

id	key	value
42	artist	Britney Spears
42	title	Toxic
42	url	file:///home/

- Support "medialists" (ordered, with duplicates, as opposed to "mediasets") in the DAG
- Token matching operator
- Fix, improve and optimize querying (more later)

Collections 2.0

Google Summer of Code 2008 project by Erik Massop (nesciens)

• Support for sources:

id	key	source	value
42	artist	plugins/id3v2	Britny Spaers
42	artist	clients/nycli	Britney Spears
42	title	plugins/id3v2	Toxic
42	url	server	file:///home/

- Support "medialists" (ordered, with duplicates, as opposed to "mediasets") in the DAG
- Token matching operator
- Fix, improve and optimize querying (more later)

3. Usage

"how, then?"

Command-line Interface

Collections are exposed in *nycli* (the new XMMS2 CLI) through

collection patterns

e.g.:

- Idioteque
- Pink Floyd Echoes
- artist:"Sufjan Stevens" l:Illinois
- (genre:Rock OR genre:Pop/Rock) date<1980
- title~usa url:*ogg +tag.favourite in:Awesome

Collection Patterns

- API helper function to parse patterns into collection structures
- Supported in multiple *nycli* commands:
 - search <pattern>
 - add <pattern>
 - jump <pattern>
 - coll create <name> <pattern>
 - etc.
- More generally: share a common syntax across clients (GUI, CLI, etc)

Note: NOT a bijection with collection structures

Collection Patterns

seb@crookshanks:"			
<pre>seb@crookshanks ~ \$ nyxmms2 sear [Result]</pre>	rch a:Hercules* duration\>	>300000 # i.e. >5min	
id artist 1577 Hercules And Love Affair 1579 Hercules And Love Affair	album Hercules And Love Affai Hercules And Love Affai	title ir Blind ir Easy 	0]
seb@crookshanks ~ \$		LCount:	2]

nycli (new official CLI) http://xmms2.sf.net/

Collection Patterns

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Hercules And Love Affair	Blind	6:18	Never		
Hercules And Love Affair	Easy 5:21 Never		Never		
	<u> </u>				

abraca <u>http://abraca.xmms.se</u>/

Collection Structure API

Collection (1.0) Query API

=> List of object ids matched by coll, ordered by the list of properties order, optionally restricted to a range.

=> Dict of properties (selected by fetch) of objects matched by coll, ordered by the list of properties order, optionally restricted to a range and grouped.

Collection Query Example

```
coll_query_infos(conn, m_join,
        ['artist','album','tracknr'],
        0, 50,
        ['artist', 'title']);
=> [{artist: 'Pink Floyd', title: 'Eclipse'},
        {artist: 'Pink Floyd', title: 'Echoes'},
        {artist: 'Britney Spears', title: 'Toxic'},
        ...]
```

Collection Query Example

Collection Server API

Save collections in the XMMS2 server:

xmmsc_coll_save(conn, coll, name, namespace); xmmsc_coll_get(conn, name, namespace); xmmsc_coll_list(conn, namespace); xmmsc_coll_rename(conn, name, to, namespace); xmmsc_coll_remove(conn, name, namespace);

xmmsc_coll_find(conn, media_id, namespace);

Spring <u>http://my-trac.assembla.com/spring</u>/

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Spring <u>http://my-trac.assembla.com/spring/</u>

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Spring <u>http://my-trac.assembla.com/spring</u>/

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Fever Ray	I'm Not Done	4:19	2009-08-31		

abraca <u>http://abraca.xmms.se</u>/

Collection Editor			
	Equals(field = "album", value = "Meddle", case_sensiti	ve = "true")	
	SomeColl	Detai	5
	Or	Field:	album
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	field: album value: Meddle case_sensitive: true Reference namespace: Collection: reference: Foo	5	☑ Case sensitive
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			<u>X C</u> ancel <u>Save</u>

Etude

http://code.google.com/p/etude-music-player/

4. Future

"fair enough, what's next?"

Collections 2.0

Finish & Merge:

- New querying API
- Finalize support for sources
- Performance optimization
- More tests

Coll 2.0: Advanced Queries

Current querying too limited:

- No count
- No custom aggregation function
- No variable in operators (lastplayed<NOW-Iday)
- Simplistic grouping, always returns flat tuples

=> Collections 2.0 will allow specifying the "cluster structure" to return.

Not unlike Freebase querying, API still under works.

New Uses/GUI Front-Ends

- Save filtered views, load and edit them
- Organize using "shelf analogy":
 - spatial
 - drag entities as filters (e.g. artist, tag) or atomically (e.g. selection of tracks)
- New & custom views, e.g. on a timeline, by properties, etc.
- Share across XMMS2 server instances (à la XSPF)

S4 (Storage System for Short Strings)

- New XMMS2 media library backend, optimized for our data model
- Uses collections as native query language
- Doesn't support all operators, only works with sets (selection of properties, grouping, ordering done externally)
- => brings collections to the world, as a generic interface for browsing, searching & organizing collections of objects!

5. Conclusion

"is that it?"

Conclusion

- Simple common abstraction of searching, browsing and organization
- Flexible: can be modified, refined, composed
- Powerful API for building UIs to manipulate a large database of information
- Works well for XMMS2
- Could be applied to other collections of objects

http://xmms2.sf.net/